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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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HONEYWELL INTERNATIONAL INC.
101 COLUMBIA ROAD
P O BOX 2245
MORRISTOWN, NJ 07962-2245

EXAMINER	
SCHINDLER, DAVID M	

ART UNIT	PAPER NUMBER
2862	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/696,215	GUALTIERI, DEVLIN M.	
	Examiner	Art Unit	
	David M. Schindler	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5,7,9-14,16,18-20 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,7,9-14,16,18-20 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the communication filed 1/8/2007. Upon further consideration, the previously indicated allowability of claims 7,10,16, and 19 is withdrawn in view of the art rejection found below.

Response to Arguments

2. Applicant's arguments filed 1/8/2007 have been fully considered but they are not persuasive.

With regard to the arguments found in the last two paragraphs of page 1 and lines 1-3 of page 2 of the Remarks, the Examiner respectfully disagrees. Applicant argues that Ham et al. (herein referred to as "Ham") teaches measuring the frequency of amplitude modulation, and not the amplitude of frequency modulation. The Examiner notes that this feature is not claimed. The claimed invention states, in part, that a frequency modulation (FM) demodulator is operable to supply a proximity signal having an amplitude that varies with, and is representative of, the proximity of each of the turbine blades (see lines 11-14 of claim 1 for example). Therefore, it does not appear that the feature of measuring the amplitude of frequency modulation appears the claims. The Examiner also notes that the generating and detecting a frequency modulated signal as recited in the claims and argued by applicant is

included in Ham as it is a property of the system of Ham. The Examiner notes page 11 of applicant's specification. Specifically, the Examiner notes that applicant is using a sensor coil in parallel with a capacitive element to form a parallel-resonant LC tank circuit (see lines 7-8 of page 11 / note Ham discloses the same feature (note (44) in combination with (20) in the Figure of Ham)). Also note paragraph [0034] on page 11, of applicant's specification. Specifically, note the disclosed formula, and that "As is also generally known, when an inductance coil, such as the sensor coil 302, is in close proximity to a conductor, such as a turbine blade, the conductor acts as a shorted coil turn that counteracts the inductance of the last coil turn. Thus, the sensor coil 302, when implemented in the turbine engine 200 as outlined above, will exhibit an inductance (L) that varies with the proximity of the sensor coil 302 to the turbine blades 204" as noted on lines 4-9 of paragraph [0034] of page 11 of applicant's specification. Therefore, and as can be seen from the formula disclosed by applicant, as the value of L changes, the frequency will change, and thus the claimed frequency modulation is a property of the system of Ham, and thus the sensor signal seen by the transistor will be a frequency modulated sensor signal. The Examiner additionally notes that a frequency modulation detector is no

longer claimed. With regard to the argument that the invention of Ham has no detector in the usual radio frequency sensor of the term, the Examiner notes that this is not claimed. The Examiner notes that Ham does disclose a frequency modulation demodulator by stating that "the operation may be looked upon as involving the modulation of a high frequency carrier, with demodulation effected by the class C operation of the oscillator transistor" on the last line of column 3 through line 3 of column 4.

With regard to the second full paragraph of page 3 of the Remarks, the Examiner notes that Oates is not used to teach the features argued by applicant.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 20, 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Ham et al. (Ham) (3,177,711).

As to Claims 1 and 25,

Ham discloses a sensor coil (20), an oscillator circuit ((the components of (24) plus (44), but excluding (28), (40), and (42)) including a capacitive circuit element (44) electrically coupled in parallel with the sensor coil to thereby form a parallel-resonant LC tank circuit (Figure) having a resonant frequency that varies with the proximity of the sensor coil to each of the turbine blades (Column 3, Lines 36-58), the oscillator circuit operable to generate and supply a sensor signal having a frequency that varies based on the resonant frequency of the parallel-resonant LC tank circuit ((Column 1, Lines 42-56) and (Column 3, Lines 36-58)), whereby the sensor signal is a frequency modulated sensor signal, and a frequency modulation (FM) demodulator ((28) in combination with (40) and (42) / (Column 3, Lines 66-72) and (Column 4, Lines 1-8)) adapted to receive the frequency modulated sensor signal and operable, in response thereto, to supply a proximity signal having an amplitude that varies with (Column 3, Lines 1-3 and 51-55), and is representative of, the proximity of each of the turbine blades to the non-rotating turbine component ((Column 1, Lines 51-56) and (Column 3, Lines 36-58)).

As to Claim 20,

Ham discloses a turbine case (Figure), a turbine wheel

rotationally mounted within the turbine case (Figure), a plurality of turbine blades extending from the turbine wheel toward the turbine case (Figure), and a turbine blade proximity sensor system including a sensor coil (20) disposed at least partially within the turbine case,, an oscillator circuit ((the components of (24) plus (44), but excluding (28), (40), and (42)) including a capacitive circuit element (44) electrically coupled in parallel with the sensor coil to thereby form a parallel-resonant LC tank circuit (Figure) having a resonant frequency that varies with the proximity of the sensor coil to each of the turbine blades (Column 3, Lines 36-58), the oscillator circuit operable to generate and supply a sensor signal having a frequency that varies based on the resonant frequency of the parallel-resonant LC tank circuit ((Column 1, Lines 42-56) and (Column 3, Lines 36-58)), whereby the sensor signal is a frequency modulated sensor signal, and a frequency modulation (FM) demodulator ((28) in combination with (40) and (42) / (Column 3, Lines 66-72) and (Column 4, Lines 1-8)). (Column 3, Lines 66-72) and (Column 4, Lines 1-8)) coupled to receive the frequency modulated sensor signal and operable, in response thereto, to supply a proximity signal having an amplitude that varies with (Column 3, Lines 1-3 and 51-55), and is representative of, the proximity of each of the turbine

blades to the turbine case or one of the components mounted thereto ((Column 1, Lines 51-56) and (Column 3, Lines 36-58)).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Oates et al. (herein referred to as "Oates") (4,644,270).

As to Claim 2,

Ham does not disclose a display coupled to receive the proximity signal from the FM demodulator and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud.

Oates discloses a display coupled to receive the proximity signal from a detector and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud (Column 11, Lines 19-32).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include a display coupled to receive the proximity signal from the FM demodulator and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud given the above disclosure and teaching of Oates in order to provide a readily available readout to a user.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Iida et al. (6,658,216).

As to Claim 4,

Ham discloses as explained above.

Ham does not disclose the FM demodulator includes a ratio detector.

Iida et al. discloses the FM demodulator includes a ratio detector (Column 6, Lines 33-37).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include the FM demodulator includes a ratio detector as taught by Iida et al. in order to advantageously provide signal demodulation.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Arms et al. (5,497,147).

As to Claim 5,

Ham discloses as explained above.

Ham does not disclose the oscillator circuit is configured to wirelessly transmit the sensor signal; and the FM demodulator circuit is configured to wirelessly receive the transmitted sensor signal.

Arms et al. discloses the oscillator circuit is configured to wirelessly transmit the sensor signal; and the FM detector circuit is configured to wirelessly receive the transmitted sensor signal ((Figures 4 and 5) and (Column 2, Lines 33-51).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include the oscillator circuit is configured to wirelessly transmit the sensor signal; and the FM demodulator circuit is configured to wirelessly receive the transmitted sensor signal given the above disclosure and teaching of Arms et al. in order to advantageously allow for remote data processing.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Barclay et al. (Barclay) (5,854,553).

As to Claim 7,

Ham discloses as explained above.

Ham does not disclose a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at least one of the capacitance circuit elements.

Barclay discloses a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at least one of the capacitance circuit elements ((Figures 1b and 2) and (Column 5, Lines 13-30)).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at least one of the capacitance circuit elements as taught by Barclay in order to reduce the number of components necessary to form a desired resonant circuit (note Column 5, Lines 26-41).

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Wilkinson (GB 2167603 A).

As to Claim 9,

Ham discloses as explained above.

Ham does not disclose a ceramic core, and a conductor selected from a group consisting of platinum and molybdenum.

Wilkinson discloses a ceramic core and a conductor consisting of platinum (Page 1, Left Column, Lines 51-54).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include a ceramic core and a conductor consisting of platinum as taught by Wilkinson in order to have a sensor that gives a fast an accurate response and can withstand corrosive environments (Page 1, Left Column, Lines 29-33).

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Schroeder (6,486,657).

Ham discloses as explained above.

Ham does not disclose a peak detector coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal.

Schroeder discloses a peak detector (30) coupled to

receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal ((Column 4, Lines 55-67) and (Column 5, Lines 1-15)).

It would have been obvious to a person of ordinary skill to modify Ham to include a peak detector coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal as taught by Schroeder in order to provide a failure circuit that provides for the recognition of failure modes (Column 5, Lines 7-11).

12. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Stowell (4,842,477).

As to Claim 11,

Ham discloses a sensor coil (20), an oscillator circuit ((the components of (24) plus (44), but excluding (28), (40), and (42)) including a capacitive circuit element (44) electrically coupled in parallel with the sensor coil to thereby form a parallel-resonant LC tank circuit (Figure) having a resonant frequency that varies with the proximity of the sensor coil to each of the turbine blades (Column 3, Lines 36-58), the oscillator circuit operable to generate and supply a sensor signal having a frequency that varies based on the resonant

frequency of the parallel-resonant LC tank circuit ((Column 1, Lines 42-56) and (Column 3, Lines 36-58)), whereby the sensor signal is a frequency modulated sensor signal, and a frequency modulation (FM) demodulator ((28) in combination with (40) and (42)) adapted to receive the frequency modulated sensor signal and operable, in response thereto, to supply a proximity signal having an amplitude that varies with (Column 3, Lines 1-3 and 51-55), and is representative of, the proximity of each of the turbine blades to the non-rotating turbine component ((Column 1, Lines 51-56) and (Column 3, Lines 36-58) and (Column 3, Lines 66-72) and (Column 4, Lines 1-8)).

Ham does not disclose a controller coupled to receive the proximity signal from the FM detector and operable, in response thereto, to control the proximity of the turbine blades to the non-rotating turbine component.

Stowell discloses controlling the proximity of the turbine blades to the non-rotating turbine component (Abstract, Lines 10-15).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include a controller to control the proximity of the turbine blades to the non-rotating turbine component given the above disclosure and the teaching of Stowell

in order to prevent turbine malfunction by preventing blade damage.

As to Claim 12,

Ham discloses the non-rotating component is either a turbine case or a component coupled to the turbine shroud (Figure).

Ham does not disclose the controller controls the proximity of the turbine blades to the non-rotating turbine component by controlling turbine shroud temperature.

Stowell discloses controlling the proximity of the turbine blades to the non-rotating component by controlling turbine shroud temperature (Abstract, Lines 10-15).

It would have been obvious to a person of ordinary skill in the art to modify Ham to include the non-rotating component is either a turbine case or a component coupled to the turbine shroud, and the controller controls the proximity of the turbine blades to the non-rotating turbine component by controlling turbine shroud temperature given the above disclosure and teaching of Stowell in order to prevent turbine malfunction by preventing blade damage.

13. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of

Stowell (4,842,477) and in further view of Oates et al. (herein referred to as "Oates") (4,644,270).

Ham in view of Stowell does not disclose a display coupled to receive the proximity signal from the FM demoduator and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud.

Oates discloses a display coupled to receive the proximity signal from a detector and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud (Column 11, Lines 19-32).

It would have been obvious to a person of ordinary skill in the art to modify Ham in view of Stowell to include a display coupled to receive the proximity signal from the FM demodulator and operable, in response thereto, to supply a visual display of the proximity of each of the turbine blades to the turbine shroud given the above disclosure and teaching of Oates in order to provide a readily available readout to a user.

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Stowell (4,842,477) and in further view of Davison (4,230,436).

Ham in view of Stowell discloses as explained above.

Ham in view of Stowell does not disclose the controller, in

response to the proximity signal, supplies one or more valve control signals, and wherein the system includes one or more valves in fluid communication between a cooling air source and the turbine shroud, each valve having an actuator coupled to receive one or more of the valve control signals and operable, in response thereto, to selectively move its associated valve between an open position and a closed position, to thereby selectively cool the turbine case.

Davison discloses one valve in fluid communication between a cooling air source, the valve having an actuator that selectively moves the valve between an open position and a closed position, to thereby selectively maintain optimum rotor-to-shroud clearances ((Figures 1 and 8A-8C) and (Column 6, Lines 28-33) and (Column 8, 24-30) and (Abstract, Lines 4-11)).

It would have been obvious to a person of ordinary skill in the art to modify Ham in view of Stowell to include the controller, in response to the proximity signal, supplies one or more valve control signals, and wherein the system includes one or more valves in fluid communication between a cooling air source and the turbine shroud, each valve having an actuator coupled to receive one or more of the valve control signals and operable, in response thereto, to selectively move its associated valve between an open position and a closed position,

to thereby selectively cool the turbine case given the above disclosure and teaching of Davison in order to prevent turbine malfunction by preventing blade damage.

15. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ham et al. (Ham) (3,177,711) in view of Stowell (4,842,477) as applied to claim 11 and in further view of Barclay et al. (Barclay) (5,854,553).

As to Claim 7,

Ham in view of Stowell discloses as explained above.

Ham in view of Stowell does not disclose a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at least one of the capacitance circuit elements.

Barclay discloses a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at least one of the capacitance circuit elements ((Figures 1b and 2) and (Column 5, Lines 13-30)).

It would have been obvious to a person of ordinary skill in the art to modify Ham in view of Stowell to include a coaxial cable coupled between the sensor coil and the oscillator circuit, the coaxial cable having a capacitance that acts as at

least one of the capacitance circuit elements as taught by Barclay in order to reduce the number of components necessary to form a desired resonant circuit (note Column 5, Lines 26-41).

16. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over (Ham) (3,177,711) in view of Stowell (4,842,477) and in further view of Wilkinson (GB 2167603 A).

Ham in view of Stowell discloses as explained above.

Ham in view of Stowell does not disclose a ceramic core, and a conductor selected from a group consisting of platinum and molybdenum.

Wilkinson discloses a ceramic core and a conductor consisting of platinum (Page 1, Left Column, Lines 51-54).

It would have been obvious to a person of ordinary skill in the art to modify Ham in view of Stowell to include a ceramic core and a conductor consisting of platinum as taught by Wilkinson in order to have a sensor that gives a fast an accurate response and can withstand corrosive environments (Page 1, Left Column, Lines 29-33).

17. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over (Ham) (3,177,711) in view of Stowell

(4,842,477) as applied to claim 11 and in further view of Schroeder (6,486,657).

Ham in view of Stowell discloses as explained above.

Ham does not disclose a peak detector coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal.

Schroeder discloses a peak detector (30) coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal ((Column 4, Lines 55-67) and (Column 5, Lines 1-15)).

It would have been obvious to a person of ordinary skill to modify Ham in view of Stowell to include a peak detector coupled to receive the proximity signal and operable, in response thereto, to determine a peak value of the proximity signal as taught by Schroeder in order to provide a failure circuit that provides for the recognition of failure modes (Column 5, Lines 7-11).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on Monday-Friday (8:00AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David M. Schindler
Examiner
Art Unit 2862

DMS

JAY M. PATIDAR
PRIMARY EXAMINER